Y-12 Study on Coal Ash Risks from Exposure

Coal ash from combustion in coal-fired steam plants is a common high-volume industrial waste in the United States. Because the Oak Ridge Reservation is currently listed as a National Priorities List site, DOE was required to analyze coal ash to ensure it poses no potential threat to the public or the environment. The analysis was done as part of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) remedial investigation for the Y-12 Plant Filled Coal Ash Pond project. The evaluation showed exposure to naturally occurring constituents in coal ash can present unacceptable risks to human health and the environment.

Chemical analyses of Y-12 Plant coal ash indicated constituents and concentrations typical of coal ash from combustion of coals mined in the eastern United States. Risks to human health from exposure to these naturally occurring constituents in coal ash were evaluated for two land-use scenarios: future residential and current trespasser. Standard CERCLA risk assessment guidance was used to demonstrate that human health risks (primarily from exposure to thorium and arsenic in the coal ash) exceeded the Environmental Protection Agency's (EPA's) action levels of carcinogenic risks (risk greater than or equal to 1E-04) and noncarcinogenic hazards (hazard quotient greater than or equal to 1) for the residential land use. Risks from gamma exposure to thorium in the ash were identified as within the EPA's target risk range (risks between 1E-06 and 1E-04) for the trespasser scenario.

The ecological risk assessment indicated adverse effects to biota from exposure to various metals (primarily selenium and arsenic) in the coal ash. The high levels of sodium in the coal ash were particularly attractive to deer, enhancing their consumption of ash and increasing their risk from exposure to the metallic constituents.

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